

DTU Systems Biology

Course 27008 Exercises for group work

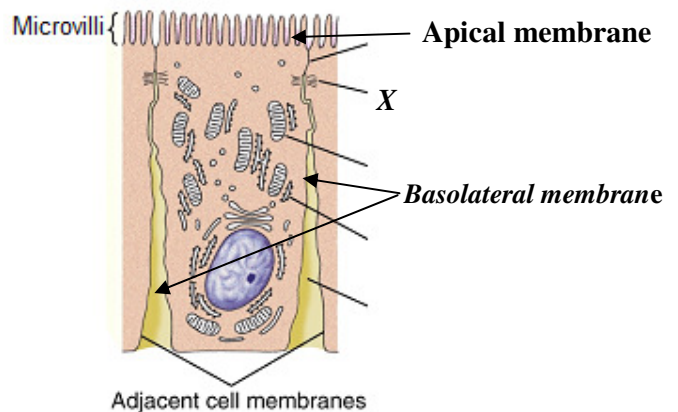
Ch6: Cell membranes

1. Which molecules make up the structure of cell membranes?

2. (Ch 3). Sketch a C18-fatty acid that has unsaturated bonds between C5-C6, C8-C9 and C17-C18.

3. Which of the following amino acids would you expect to find in the section of a membrane protein that passes through the membrane: Lys, Glu, Tyr, Ile? Explain your answer.

4. The tissue lining the inside of our gut is called the gut epithelium and is built up of epithelial cells. To ensure that the gut contents cannot bypass the epithelial cells and pass into the bloodstream, these cells are sealed to each other by one of the three "cell junctions" mentioned in Ch6. Which type of junction is this, and how is it built up?



5. How can glucose be transported into a cell across the plasma membrane, when glucose is unable to pass a lipid bilayer, and the glucose concentration is higher inside the cell than outside?

6. Phospholipids are often represented as "a ball with two tails" as in the sketch below. Which part of the phospholipid molecule is represented by

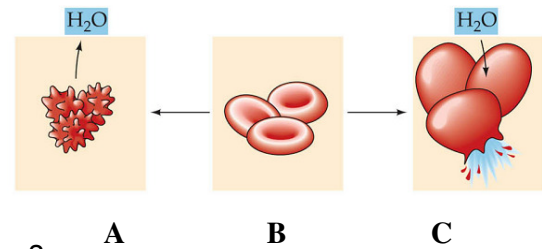
- a) the "ball"
- b) the "tails"



7. What effect on membrane function do double bonds in the fatty acid chains of membrane lipids have?

8. What are the characteristics of transmembrane proteins?

9. The figure on the right illustrates what would happen, if a red blood cell was placed in a solution with A) high (hypertonic) salt concentration B) the same salt concentration (isotonic) as within the cell or C) a very low (hypotonic) salt concentration.



Which property of the membrane is responsible for the changes in cell shape that occur in these different solutions?

10. What role of the carbohydrates that are bound to membrane proteins?

11. Give three important functions of the plasma membrane for cells.

12. What is the role of cholesterol in plasma membranes?

13. Which factors affect membrane fluidity?

14. Describe at least three functions of proteins in the plasma membrane.

15. Define the following terms:

A) Endocytosis:

B) Exocytosis:

C) Phagocytosis:

D) Pinocytosis:

16. Which factors determine whether a molecule can pass the plasma membrane?

17. Diabetics sometimes have an increased risk of blood clots as the cells in their artery linings are often shrunken and loose. What can be the reason for the cells shrinking?

18. A patient has become dehydrated and needs water urgently. You choose to apply an intravenous drip. What will happen if you give pure, distilled water via the drip?

Exam dec 05. What is the difference between primary and secondary active transport?